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DEVELOPMENT OF MIAMI INTERNATIONAL AIRPORT

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AIR TRANSPORT DIVISION

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DEVELOPMENT OF MIAMI INTERNATIONAL AIRPORT

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In 1952 Miami International Airport was the second busiest in the United States. It had 273,000 aircraft operations as compared with 295,000 at Chicago's Midway Airport and 219,000 at Los Angeles Municipal Airport, which stood in third place. During the peak month of that year 250,000 air passengers arrived and departed from Miami International Airport. In 1951, the last year for which complete statistics are available, 1,335,244 air passengers entered or left the United States. Of these, 42 percent, or 554,993, entered or left by Miami International Airport.

Soon after World War II it became apparent that the rapid growth of traffic at this airport necessitated the formulation of a Master Plan to govern the great expansion of airport facilities which would be required in the near future to handle this traffic. Before the actual design of new facilities could be undertaken, it was necessary to make a comprehensive study of the air transportation market at Miami and estimate the potential air traffic to be served.

Air traffic forecasts were prepared for a thirty year period in order to facilitate long-range planning and to provide a basis for financing the project. These traffic forecasts indicated that the ground facilities would have to be expanded more rapidly and to a much greater extent than had previously been thought necessary. The studies also indicated that the design of commercial aircraft was advancing at such a rate that existing airfield criteria could no longer be used and that new facilities must be constructed on plans easily susceptible to future expansion and alteration to meet changing operational requirements.

When attempting to correlate air traffic study with the design of future facilities it appeared that peak hour air traffic, rather than the average annual air traffic, would be the major factor limiting the growth of the airport. A greater diversion of schedules would delay the time of saturation, but it was realized that it would not be feasible to depend on such an expedient and that peak hour traffic at distant terminals may eventually aggravate the situation at Miami. It was found that the removal of test and transition flights to some outlying field would retard the time of air traffic saturation and at the same time tend to reduce the nuisance created by excessively noisy operations at the airport.

The preliminary design of the airfield was made on the assumption that even though considerable progress has been made toward the perfection of electronic navigational aids and air traffic control procedures within the last decade, a runway can still safely handle no more than forty landings and take-offs per hour during bad weather conditions when all air traffic must be controlled. It was considered doubtful that this number of operations could be obtained under all conditions of mixed traffic and that more probably it represented an obtainable maximum. The runway acceptance rate would probably approach sixty operations an hour during VFR (Visual Flight Rules) weather and two parallel runways could handle 120 operations during a peak hour if

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the ratio between landings and take-offs was approximately equal. It was realized that the airfield acceptance rate should normally be based on IFR (Instrument Flight Rules) weather conditions. However, due to the excellent flying weather existing at Miami International Airport, it was believed that the time of air traffic saturation could be predicted on the basis of runway acceptance during VFR weather. This would undoubtedly cause minor delays during IFR weather in the future. However, the duration and frequency of these delays should be such that they would not severely handicap air traffic.

Our investigations revealed that the peak hour air traffic at Miami International Airport was equal to .047% of the annual traffic, and that the annual air passengers would increase to 2,000,000 prior to 1955 and over 3,000,000 by 1965. Even this phenomenal increase in air passengers would be dwarfed by a much larger increase in air cargo, which we believe will increase to 200,000,000 pounds by 1955 and over 1,000,000,000 pounds by 1965. This volume of air cargo would require the provision of separate cargo facilities, as cargo operations would be too large to be handled as a satellite function of the passenger terminal.

Accordingly, it was decided to set aside a portion of the airport for the development of a cargo terminal. The types of cargoes handled, together with the various procedures required for domestic and international air cargo, indicated that it would be advisable to plan the air cargo area around several adjacent terminals instead of attempting consolidation of the entire operation in a single building. This resulted in the provision of three 20,000-square foot cargo buildings in the northwest portion of the airport. This separation permits the tenant airlines more ramp space for aircraft layover and at the same time provides sufficient ramp space around the buildings for direct loading into the aircraft.

When the Dade County Port Authority acquired the original airport in 1946 from Pan American World Airways and the War Assets Administration it was bisected by the Seaboard Air Line Railway break-up yards. These yards prevented the consolidation of the airport facilities and the re-design of the airfield. Negotiations between the Port Authority and the Railway were successful and the yards were removed to a new location so that, by the last half of 1951, the way was clear to begin construction of a new East/West runway. This runway has a present length of 9400' and is provided with ample space beyond the ends to insure clear approach zones within the airport property. The runway was designed to support a 100,000 pound single wheel load and was constructed with a limerock base and an asphaltic concrete surface. The shoulders, as well as the overrun areas, were stabilized in order to reduce the possibility of accident in the event that an aircraft left the pavement. The two other major runways were lengthened to 8400 feet. The airfield was next provided with a system of attendant taxiways and warm-up aprons so that during periods of dense air traffic it would be possible to guide and control taxiing aircraft.

The two East/West runways were provided with fixed focus bi-directional elevated marker lights. Each of the runway lighting circuits was provided with a five-position brightness control ranging from 0.2% to 100% of brightness. The lights were equipped with 200-watt lamps and were served through a small isolating transformer to reduce the above-ground voltage as a safety precaution in case the lights were knocked over by operating aircraft. The NW/SE and the N/S runways were lighted with medium intensity elevated marker lights which were served either individually or collectively by the same brightness control. All taxiways were lighted with elevated marker lights and the lights were arranged so that, by energizing the proper combination of circuits, an

aircraft could be routed from any part of the airfield to its desired destination by the control tower operators. All taxiway light controls are on a single panel and arranged so that they can be pre-set and then energized by one switch when desired. The panel is also equipped with bypass switches so that various taxiways may be temporarily eliminated from the pre-set taxiway combination without disturbing the setup. After the taxiway lights were installed and put into operation it was found that they could be operated at 10% of their brilliance and provide sufficient light for most weather conditions.

The storm drainage for the airport presented no immediate problem, since the porous nature of the underlying Oolite rock permitted the storm waters to percolate rapidly. However, it was evident that as a greater area of the airfield was paved the absorption rate of the remaining turfed areas adjacent to pavement would be substantially reduced because of the necessary stabilization and that an over-all drainage system would have to be planned for the ultimate development of the airport. This drainage system was designed for a 3.5 inch per hour rain and was considered adequate for a storm of 10 year frequency.

After consolidation of the airport the Port Authority was saddled with the operation of three separate sewage treatment plants. Two of the plants were rapidly becoming inadequate, while the third had deteriorated to the extent that it was of little value. A plan was prepared for the stage construction of a sewerage system that would eventually provide a single treatment plant. The plant was designed and located so that it would not interfere with the ultimate construction of the airport but would at the same time be accessible to the existing structures which are of a temporary nature. This new plant is now under construction.

Various air passenger and terminal visitor surveys have been conducted in order to determine criteria for the planning of the future terminal site. As a result of these studies, we believe that by 1960, possibly five years after the new terminal would be completed, the terminal facilities must provide sufficient space for 3,000 terminal visitors during a peak hour, of whom 640 would use the ticket counter, 1,000 would occupy the lobby, and 900 would use the restaurant facilities. During this peak hour 45,000 pounds of baggage would be handled, 2,000 automobiles would occupy the parking lot, and 85 aircraft would arrive or depart. Subsequent years will require proportionately larger terminal facilities so that the Master Plan for the terminal area must have adequate provision for expansion. All proposed utilities serving the terminal area have been planned with the future requirements in mind, even though they will be constructed in stages. Since it is entirely probable that the terminal site will first be developed in scattered areas it is also important to plan the utilities so that a large capital outlay will not be required for each additional facility, thereby discouraging small projects that would otherwise be self-amortizing.

Early in our investigations it was apparent that in order for the public to derive the maximum benefit from air transportation it would be necessary to make the airport more accessible to the center of population of Greater Miami. Therefore an express highway was included in the Master Plan and a study was made to determine the feasibility of making it a self-amortizing project. It was found that, if the highway were operated in conjunction with the Venetian Causeway, a Port Authority owned facility, the time of travel from the airport to Miami Beach could be reduced from 50 minutes to 25 minutes, and that the time of travel to the center of Miami would be reduced from 35 minutes to 15 minutes. It was therefore believed that the highway would not only appeal

to airport customers but to all crosstown traffic as well and could be amortized during a twenty-year period. The preliminary design is for the immediate construction of four traffic lanes with ample provision for the addition of two more lanes when required. The highway is planned as a limited access elevated toll road with a high level bridge over the Miami River to eliminate drawbridge traffic interruptions.

The Master Plan of Miami International Airport anticipates eventual air traffic saturation and accordingly suggests an area plan for the future development of airports within Dade County. The plan is comprehensive enough to provide facilities for the private aircraft owner and to foresee the use of jet-driven commercial aircraft, together with the acceptance of helicopter taxi service, and is at the same time fluid enough to adjust each factor to its relative importance as time goes by. Future studies will have to be made in order to re-evaluate pertinent criteria, and it may even be necessary from time to time to change what now appear as fundamental concepts. However, within the limits of the foreseeable future Miami International Airport has been provided with a workable Master Plan that will not be a financial burden to the Dade County Port Authority or to the Dade County taxpayer. It should provide adequate facilities to serve the air transportation market at Miami and never act as a "bottleneck" restricting or retarding the growth of air traffic.

PROCEEDINGS-SEPARATES

VOLUME 79 (1953)

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JANUARY: 164(SA), 165(WW), 166(WW), 167(SA), 168(CO) & (ST), D-117(ST), D-122(HY), D-125(ST).

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MARCH: 176(SA), 177(EM), 178(HY), 179(EM), 180(HY), D-123(HY), D-126(ST), D-128(ST).

APRIL: 181(WW), 182(ST), 183(ST), 184(HY), 185(EM), 186(HY), 187(ST), 188(HY), D-135(HY), D-136(ST).

MAY: 189(HY), 190(HY), 191(CP) & (AT), 192(SM) 193(HY), D-129(PO), D-138(CP), D-145(ST).

JUNE: 194(CP) & (AT), 195(SM), 196(CP) & (AT), 197(HY), 198(ST), 199(EM), D-134(HY), D-141(HY).

JULY:[a] 200(SM),[b] 201(ST),[b] 202(EM),[b] 203(SA),[b] 204(AT),[b] 205(EM),[b] 206(ST),[b] 207(SA),[b] 208(SA),[b] 209(ST),[b] 210(SU),[b] 211(EM),[b] 212(SU),[b] 213(IR),[b] 214(HW),[b] 215(SM),[b] 216(ST),[b] 217(ST),[b] 218(ST),[b] 219(ST),[b] 220(SM),[b] 221(HW),[b] 222(SM),[b] 223(EM),[b] 224(EM),[b] 225(EM),[b] 226(CO),[b] 227(SM),[b] 228(SM),[b] 229(IR).[b]

AUGUST: 230(HY), 231(SA), 232(SA), 233(AT), 234(HW), 235(HW), 236(HW), 237(AT), 238(WW), 239(SA), 240(IR), 241(AT), 242(IR), 243(ST), 244(ST), 245(ST), 246(ST), 247(SA), 248(SA), 249(ST), 250(EM),[c] 251(ST), 252(SA), 253(AT), 254(HY), 255(AT), 256(ST), 257(SA), 258(EM), 259(WW).

SEPTEMBER: 260(AT), 261(EM), 262(SM), 263(ST), 264(WW), 265(ST), 266(ST), 267(SA), 268(CO), 269(CO), 270(CO), 271(SU), 272(SA), 273(PO), 274(HY), 275(WW), 276(HW), 277(SU), 278(SU), 279(SA), 280(IR), 281(EM), 282(SU), 283(SA), 284(SU), 285(CP), 286(EM), 287(EM), 288(SA), 289(CO).

OCTOBER:[d] 290(all Divs), 291(ST),[c] 292(EM),[c] 293(ST),[c] 294(PO),[c] 295(HY),[c] 296(EM),[c] 297(HY),[c] 298(ST),[c] 299(EM),[c] 300(EM),[c] 301(SA),[c] 302(SA),[c] 303(SA),[c] 304(CO),[c] 305(SU),[c] 306(ST),[c] 307(SA),[c] 308(PO),[c] 309(SA),[c] 310(SA),[c] 311(SM),[c] 312(SA),[c] 313(ST),[c] 314(SA),[c] 315(SM),[c] 316(AT),[c] 317(AT),[c] 318(WW),[c] 319(IR),[c] 320(HW).[c]

NOVEMBER: 321(ST), 322(ST), 323(SM), 324(SM), 325(SM), 326(SM), 327(SM), 328(SM), 329(HW), 330(EM), 331(EM), 332(EM), 333(EM), 334(EM), 335(SA), 336(SA), 337(SA), 338(SA), 339(SA), 340(SA), 341(SA), 342(CO), 343(ST), 344(ST), 345(ST), 346(IR), 347(IR), 348(CO), 349(SM), 350(HW), 351(HW), 352(SA), 353(SU), 354(HY), 355(PO), 356(CO), 357(HW), 358(HY).

DECEMBER: 359(AT), 360(SM), 361(HY), 362(HY), 363(SM), 364(HY), 365(HY), 366(HY), 367(SU),[e] 368(WW),[e] 369(IR), 370(AT),[e] 371(SM),[e] 372(CO),[e] 373(ST),[e] 374(EM),[e] 375(EM), 376(EM), 377(SA),[e] 378(PO).[e]

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a. Beginning with "Proceedings-Separate No. 200," published in July, 1953, the papers were printed by the photo-offset method.

b. Presented at the Miami Beach (Fla.) Convention of the Society in June, 1953.

c. Presented at the New York (N.Y.) Convention of the Society in October, 1953.

d. Beginning with "Proceedings-Separate No. 290," published in October, 1953, an automatic distribution of papers was inaugurated, as outlined in "Civil Engineering," June, 1953, page 66.

e. Discussions, grouped by divisions.

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